September 25, 2006

MEMORANDUM

To: Dave Anderson
Engineering Manager
Twin Falls Regional Office

From: Steve M. Ogle, P.E.
Staff Engineer

Subject: Staff Analysis for DRAFT Wastewater Reuse Permit No. LA-000210-01
Raft River Energy I LLC, Malta

1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of the *Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater*, IDAPA 58.01.17.400, for issuing wastewater reuse permits (WRPs). This memorandum addresses draft WRP No. LA-000210-01, for the geothermal power project operated by Raft River Energy I LLC (Raft River), located near Malta, Idaho.

2. SUMMARY OF EVENTS

Raft River is developing a geothermal power project approximately 15 miles south of Malta, Idaho. As part of this project, Raft River has proposed land application of non-contact cooling water generated by the power plant. Although non-contact cooling water does not constitute wastewater as defined by the *Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater* (i.e., refer to IDAPA 58.01.17.200.33) and may be exempt from the explicit requirement to obtain a WRP prior to land application, Raft River has elected to apply for a WRP in consideration of the *Ground Water Quality Rule* (GWQR), IDAPA 58.01.11.

A pre-application meeting between representatives from Raft River and DEQ was held in June of 2006, and Raft River subsequently submitted a permit application package dated June 22, 2006. Additional meetings to discuss various aspects of the application package were held between Raft River and DEQ personnel on July 6, July 12, and September 14, 2006.

The 2006 permit application and other supplemental information submitted by the permittee, available in DEQ's source file for this facility, were used to develop the current, draft WRP for Raft River's Malta facility.

3. SITE DISCUSSION AND PROCESS DESCRIPTION

This section presents relevant area/site characterization information and details the nature of the facility and associated land application/water reuse system. A site map depicting the physical features discussed in this section of the staff analysis is in contained within Appendix 2 of the permit.

3.1 Site Characterization

This project is located in a section of the Raft River Valley located roughly six miles north of the Idaho-Utah border and southwest of State Highway 81, and is bounded by the Jim Sage Mountains to the west and the Black Pine Range to the east. The actual site of the power plant facility is between 2950 South and the Raft River.

3.1.1 Soils Evaluation

The WRP application indicates that onsite soils consist largely of silt loams extending to 60 inches. The site subsurface consists of discontinuous stream alluvium, sand lenses, and clay layers. The application materials indicate that the primary land use has been for agricultural purposes, including irrigated farming (i.e., alfalfa, grass hay, and feed grains) and cattle grazing.

DEQ notes that Raft River's application does not include any analytical soil data; however, the WRP requires Raft River to collect analytical soils data once per year. Given the similarity in previous and planned future uses of the site (i.e., refer to Section 3.3 of this document), this should be sufficient to establish adequate soil characterizations and ensure proper oversight of the affected areas.

3.1.2 Surface Water Evaluation

As indicated previously in this document, the power plant facilities are located along the Raft River. The Raft River flows from the southwest to the northeast across the site, and eventually drains into Lake Walcott on the Snake River. This section of the Raft River is commonly used for agricultural irrigation and watering livestock.

The affected section of the Raft River is a Section 303(d)-listed water body, in accordance with the Clean Water Act, and currently has beneficial use designations for cold water communities, salmonid spawning, and primary contact recreation (i.e., refer to IDAPA 58.01.02.150.12, Unit US-8). This section of the river is further characterized in DEQ's Raft River Subbasin Assessment and Total Maximum Daily Loads (TMDL), dated January 20, 2004, and is subject to TMDL limits for temperature, bacteria, and bed load sediment.

3.1.3 Ground Water Evaluation

Raft River's WRP application materials indicate that the surface of the shallow ground water aquifer in this area is approximately 20 to 90 feet below the ground surface, extending intermittently downward to a depth of 600 feet. The application indicates that an aquitard is thought to exist from 600 to 1500 feet below the ground surface, with intermediate and geothermal aquifers occurring below the aquitard. Ground water flow in the shallow ground water aquifer is consistent with that of the Raft River, flowing in a northeastern direction in the immediate area of concern. Ground water in this region is typically used for domestic, irrigation, and industrial purposes, and the aquifer is currently classified as a general resource aquifer in accordance with IDAPA 58.01.11.300.

Table 3.1 contains selected results from analyses conducted on a series of ground water samples collected from local, area wells, as reported in Raft River's WRP application materials. These wells appear to be constructed in the shallow aquifer, are located both up and down gradient of the proposed wastewater reuse sites, and have typically been used as domestic or irrigation wells in the past. Results from these particular wells have been included here because they were identified within Raft River's WRP application as the sources of ground water that will be used for non-contact cooling water by the facility. It should be noted that Table 3.1 only presents data for a select group of constituents in a select group of wells; Raft River's WRP application materials contain additional analytical results from other area wells, as well as analytical data for additional constituents (i.e., it should be noted that these

additional constituents were not present in concentrations representing a concern to primary or secondary ground water quality standards of IDAPA 58.01.11.200.01.a and .b).

Table 3.1: Select Water Quality Parameters of Ground Water Samples from Select Area Wells

Well ID[a]	Sample Date	Constituent Concentrations/Ground Water Quality Parameters[b, c]								
		Arsenic (mg/L)	**Lead (mg/L)**	**Nitrate (mg/L)**	**Fluoride (mg/L)**	**Total Dissolved Solids (mg/L)**	**Iron (mg/L)**	**Manganese (mg/L)**	**Chloride (mg/L)**	**pH**
26CAB1-IR[d]	7/1/05				0.25	**792**			**273**	7.8
	10/23/05	<0.001	<0.005	0.058	2.20	**998**	**1.18**	**<0.05**	**412**	7.8
27CDD1-IR[e]	7/1/05				0.24	**784**			238	7.8
	7/29/05				2.06	**1170**			**646**	7.8
	10/23/05	<0.001	<0.005	<0.02	**5.10**	**1940**	**4.31**	**<0.05**	**1100**	8.3
27DBB1-IR[e]	10/23/05	0.004	<0.005	0.58	1.20	**960**	**12.2**	**2.18**	**344**	7.6
33AAA1-IR[e]	10/23/05	0.021	<0.005	0.13	<1.0	**646**	**6.99**	**0.14**	227	7.6
RRP-1	7/29/05				1.17	**794**			**291**	7.8
	10/23/05			<0.02	1.20	**724**			**274**	**8.8**
23ABD1-IR[d]	7/29/05	<0.005			2.45	**1470**			**748**	7.9
	10/23/05	<0.001	**0.049**	0.43	3.50	**1710**	**4.98**	**<0.05**	**944**	8.3
23ABA1-IR[d]	7/29/05			0.2	1.53	**836**			**352**	7.7
	10/23/05	0.004	**0.015**		**4.00**	**1940**	**6.41**	**<0.05**	**1030**	8.0
Applicable GWQR Standard:		**0.05**	**0.015**	**10**	**4**	**500**	**0.3**	**0.05**	**250**	**6.5 - 8.5**

[a]Well ID numbers listed are Raft River's designations and can be spatially correlated to locations shown on Map 3 in the application by using the table in Attachment B of the application materials.
[b]Raft River's WRP application materials contain additional analytical data for cadmium, chromium, copper, mercury, selenium, zinc, sulfate, boron, molybdenum, nickel, potassium, alkalinity, bicarbonate, silica, and total dissolved hardness. Refer to Tables 2 and 3, and Attachment C of the application).
[c]Bolded concentrations/parameters are those that approximate or exceed GWQR standards. The presence of a "<" delimiter implies that analytical results were below the minimum detection limit of the analytical method employed.
[d]These wells are located down gradient of the proposed reuse sites.
[e]These wells are located up gradient of the proposed reuse sites.

As shown in the table, the primary ground water quality standards for lead and fluoride were exceeded in two wells, while the secondary standards for total dissolved solids (TDS), iron, manganese, and chloride were exceeded in nearly every ground water sample from each of the wells. Additionally, there was an excursion of the secondary pH standard in ground water from one of the wells. Raft River has asserted that local ground water quality may have been adversely impacted by past uses and irrigation practices on the site, which involved agricultural irrigation with both ground water and surface water, since 1952.

3.2 Process Description

Raft River has proposed to construct and operate a geothermal power plant. Essentially, hot water from a localized geothermal reservoir will be used to heat a working fluid, contained in a closed loop system, to drive a turbine/generator unit to produce electricity. Vaporized working fluid that is discharged from the turbine will be re-condensed in water-cooled condensers prior to reuse in the system. The condensers are also a closed loop system, and will utilize water taken from local production wells (i.e., refer to Table 3.1) to re-condense the working fluid. After the non-contact cooling water is used to re-condense the working fluid, it will be routed to a cooling tower, where it will be air-cooled and reused. Makeup water from water supply wells will be added to the non-contact cooling water system to replace losses due to cooling tower evaporation, cooling tower drift, and blowdown (i.e., to remove scaling from the cooling tower). Over time, constituents in the non-contact cooling water will become concentrated and subsequently will be discharged to designated sites for slow rate land

application and/or ground water recharge. Raft River has specifically proposed use of the non-contact cooling water 1) to supplement the irrigation water requirements on irrigated farm land during the growing season (i.e., land application), and 2) for use in a linear surface infiltration system to recharge ground water in the non-growing season.

3.3 Non-Contact Cooling Water Evaluation

The source of the non-contact cooling water will be existing production wells that were previously used for irrigation or domestic purposes. The specific wells identified for this use are list in Table 3.1 of this document. These wells were constructed in the shallow aquifer with reported depths ranging from 100 to 600 feet. After use as non-contact cooling water, a portion of the cooling water referred to as cooling water blowdown (i.e., cooling water removed to manage system water quality) will be discharged to the land application/recharge system. The quality of the non-contact cooling water will largely be a function of ground water quality, the type(s) and quantities of additives introduced into the cooling water as part of the facility's process/operation, and the degree to which the non-contact cooling water is concentrated (i.e., by evaporation) within the cooling tower loop.

Section 3.1.3 of this document briefly addressed existing ground water quality and identified several constituents of concern, based on analytical results from a well sampling effort conducted as part of the WRP application. Based on the information presented within the application, the ground water constituents of concern at this time are thought to be lead, fluoride, TDS, iron, manganese, and chloride. In the event that any other water(s) are to be used as non-contact cooling water, Raft River will be required to obtain DEQ approval prior to use of such water(s) (i.e., refer to Section 4.2.1 of this document).

Raft River's WRP application indicates that several cooling water additives are under consideration for use. The list appears to be somewhat preliminary at this time, but currently includes sulfuric acid and phosphonates, as well as unspecified polymers, dispersants, and corrosion inhibitors. The purpose of these additives is largely to augment and improve the efficiency of facility operations, and it is likely that these substances will be added in very small quantities; however, DEQ notes that these chemicals and/or constituents could represent a concern to ground water quality as they are land-applied over time. Consequently, the permit requires that Raft River maintain a complete log of the types and amounts of additives introduced to the non-contact cooling water (i.e., refer to Section 4.5.1 of this document).

The WRP application materials utilize a concentration factor of 2.5 to estimate non-contact cooling water quality parameters, although it should be noted that the application also indicates a concentration factor of 4 could be obtained at the facility by use of cooling water pretreatment.

Raft River's WRP application materials project that an average annual flowrate of 400 gallons of non-contact cooling water per minute will be discharged as cooling water blowdown. The average annual flowrate is based upon the current water rights associated with the existing production wells (i.e., this is the maximum volume of water that can be taken from the wells for use as non-contact cooling water). Based on this hydraulic loading rate, the constituent concentrations in the ground water (i.e., refer to Table 3.1 of this document), and a concentration factor of 2.5, it is possible to project specific constituent loading rates to the land application sites. Although not reproduced in this document, example calculations for the estimated, average annual TDS loading rate are presented within Raft River's WRP application materials. The same calculation methodology can be used to estimate loading rates for other constituents of concern.

It is important to note that the proposed land application sites were historically irrigated with localized ground and surface waters prior to Raft River's operation, and that source of Raft River's non-contact cooling water will be the same ground water that was historically been applied onsite; consequently, the average annual mass loading rates of any given ground water constituent should generally be the same after startup of non-contact cooling water land application. The significant change, with respect to site management, is that the annual

hydraulic loading rate will be decreased, due to evaporated water that will be lost to atmosphere from the cooling tower.

Raft River's WRP application package included long-term water quality modeling assessments based around TDS concentrations, which indicate that the change from irrigated fields to land application of non-contact cooling water will not cause degradation of existing TDS ground water quality. The application asserts that similar results could be expected for other constituents of concern.

DEQ notes that there is no apparent or substantial evidence to refute Raft River's impact assessment; however, the inherent uncertainties in any ground water impact assessment (e.g., accuracy of the assumptions utilized, limitations of modeling equations applied, etc.) appear to require an ongoing monitoring program for ground water and soils in the affected area to ensure that the impact assessment is valid over time. These monitoring requirements are further discussed in Section 4 of this document.

3.4 Miscellaneous Site Issues

Other relevant permitting issues associated with this facility include possible use of onsite grazing to clear the irrigated hydraulic management units (HMUs) and buffer zones for domestic water supplies. These issues have been addressed within the regulatory framework of the permit, and will be discussed in the next section of this document.

4. REGULATORY DISCUSSION

This section of the staff analysis discusses the regulatory and technical bases for terms and conditions within the draft version of WRP No. LA-000210-01, although it should be noted that administrative aspects of the permit (e.g., Sections A-D, I, and J) are not specifically addressed within this document.

4.1 Hydraulic and Constituent Loading Rates

As was discussed in Section 3.3 of this document, Raft River has presented substantial evidence that land application of the non-contact cooling water will not result in adverse impacts to existing ground water quality. Based on the information and assessment work presented in Raft River's WRP application, DEQ is not requiring any hydraulic or constituent-based rate loading limits for the facility at this time, although it must be noted that the permit does require monitoring of the non-contact cooling waters, ground water, and soils at this site to allow ongoing assessments for any adverse impact(s) that may occur over time. The permittee is required to report such monitoring on an annual basis, and DEQ will review these submittals in an effort to assure ongoing compliance with all applicable state requirements. DEQ notes that certain provisions of Idaho's *Water Quality Standards, Ground Water Quality Rule,* and *Wastewater Rules* (i.e., IDAPA 58.01.02, 58.01.11, and 58.01.16, respectively) may apply to the facility's proposed operations, and portions of the WRP are intended to ensure compliance with applicable provisions of these rules. In the event that DEQ should determine the facility's land application operations are resulting in adverse impacts, the agency may modify the permit in accordance with IDAPA 58.01.17.700 to include hydraulic and/or constituent-based loading rate limits necessary to mitigate such impacts.

Additionally, DEQ notes that the ground water impact assessment conducted for this facility is based on average ground water quality parameters from specific, area wells. In the event that another source of water is used for non-contact cooling water at this facility, it may invalidate certain assumptions used in the ground water assessments that form the basis of this permit, unless Raft River demonstrates that the quality of the new source is geochemically similar to the previous source. Consequently, the permit stipulates that Raft River is only allowed to use ground water from wells identified within the permit application for use as non-contact cooling water (i.e., refer to Section 4.2.1 of this document for further discussion).

4.2 Site-Specific Permit Conditions – Section F

4.2.1 Non-Contact Cooling Water Restriction

As stated previously, the ground water impact assessment conducted for this facility is based on average water quality parameters from specific, area wells. Moreover, the water rights associated with these wells was used to establish the average, annual flowrate of 400 gallons per minute. If other sources of water (i.e., with different constituents and/or constituent concentrations) are used for non-contact cooling water at this facility, it may invalidate the ground water assessment that forms the basis of this permit. Similarly, if water rights for these wells are increased subsequent to issuance of the WRP, the maximum flowrate discharged to the HMUs could increase and may invalidate the ground water assessment. Consequently, Section F of the permit requires that Raft River submit a permit modification package for DEQ review and approval, prior to using any water source not identified within the permit application or in the event that the water rights for the identified water sources are increased. This permit requirement is intended to assure that the assumptions forming the basis of this permit will remain valid over time. The wells listed in Table 3.1 of this document are the specific wells that were used to establish baseline ground water quality parameters, and were also used to establish non-contact cooling water parameters used within Raft River's impact assessment.

4.2.2 Ponding Restrictions

Section F of the permit requires Raft River to operate the land application facilities to prevent ponding, to the maximum extent reasonably possible. The permit requires installation, operation, and maintenance of equipment, structures, and other best management practices (BMPs) to prevent and correct ponding. Additionally, Raft River must prevent non-contact cooling water from ponding in the fields to the point where the ponded water putrefies or supports vectors or insects. This provision is intended to prevent any nuisance and/or odor issues associated with the land application facilities.

4.2.3 Runoff/Wellhead Protection Requirements

Section F of the permit requires the permittee to manage the land application site in accordance with an approved Runoff Management Plan. The Runoff Management Plan is required under Compliance Activity No. CA-210-03 of the permit, and is further discussed in Section 4.5.3 of this document. The BMPs outlined in the plan are to be used to prevent runoff from any site or field used for wastewater reuse to any property not owned by Raft River, except after a 25-year, 24-hour storm event or greater. This storm event is to be defined by use of the Western Regional Climate Center (WRCC) Precipitation Frequency Map, Figure 28 "Isopluvials of a 25-YR, 24-HR Precipitation". For the Raft River site, the 25-year, 24-hour event is 2.2 inches. This permit condition is intended to protect the Raft River from receiving any additional sediment loadings due to the land application of the non-contact cooling water.

4.2.4 Livestock Grazing Plan Requirement

The permit requires submittal of a Grazing Management Plan, to be reviewed and approved by DEQ prior to initiation of any grazing activities onsite. This plan would be incorporated into the facility's Plan of Operation (i.e., refer to Compliance Activity No. CA-210-01 and Section 4.5.1 of this document for further discussion of the Plan of Operation). The facility has indicated that there are plans to implement grazing activities, although no concise management plan was included within the permit application materials. Consequently, DEQ has inserted this permit provision to allow regulatory oversight of the type and extent of the grazing activities to be implemented on the land application system.

4.2.5 Ground Water Quality Restriction

The following language appears under the Ground Water Quality Restriction in Section F of the permit:

> "Wastewater or non-contact cooling water land application activities conducted by the permittee shall not cause a violation of the *Ground Water Quality Rule* (GWQR), IDAPA 58.01.11."

As was discussed earlier in this document, a primary purpose of this permit is to protect ground water quality, and this permit provision requires the facility's land application treatment operations to comply with the GWQR.

4.2.6 Construction Plan Submittal Requirement

The WRP requires Raft River to submit plans and specification for DEQ review and approval, prior to construction or modification of any wastewater facilities associated with the land application system. This is intended to allow ongoing regulatory oversight of any future modifications to the land application system and associated operations. DEQ notes that installation of any additional geothermal power plant modules may trigger this provision, if such installation requires construction of any new wastewater facilities or modification of any existing wastewater facilities at the site.

4.2.7 Buffer Zones Requirement

Buffer zones of 500 feet or more are required between land application areas and domestic water supplies, except that 1000 feet is required for a public water supply, unless a DEQ-approved well location acceptability analysis indicates an alternative buffer zone is acceptable. This permit condition is intended to protect drinking water sources.

4.2.8 Supplemental Irrigation Water Protection Requirement

This requirement mandates installation of a DEQ-approved backflow prevention device, where fresh irrigation water and non-contact cooling water interconnections exist in the land application systems, to prevent contamination of the irrigation water source (i.e., ground water or surface water, in this case). This requirement is intended to protect ground water and/or surface water quality.

4.3 Monitoring Requirements – Section G

The monitoring provisions needed to assess and/or establish ongoing compliance with site-specific permit requirements and state requirements are given in the following sections of this memorandum.

It should be noted that the facility has asserted that no crop monitoring provisions are required for these sites because the ground water quality impact assessment did not account for any plant uptake or constituent removal to demonstrate that no adverse ground water quality impacts would occur. DEQ has acknowledged the facility's request in this matter and has not included such provisions within the permit; however, it must be noted that the impact assessment conducted for this site assumed that evapotranspiration occurs. This assumption effectively reduces the hydraulic loading to the HMUs, and subsequently reduces advective aspects of contaminant transport into ground water. Consequently, sufficient crops must be maintained onsite to ensure the validity of the modeling assumption. DEQ will largely rely on visual assessments conducted during routine inspections of the facility to assure that onsite crops are managed properly.

4.3.1 Total Volumetric Flowrate Measurement Requirement – Non-Contact Cooling Water Discharge/Monthly Parameter

Raft River must monitor and record the non-contact cooling water loading rate to each HMU to assess the annual hydraulic and constituent loading rates on each HMU. This monitoring requirement specifies a monthly recording basis, and the non-contact cooling water discharge point to land as the monitoring point.

4.3.2 Water Quality Monitoring Requirements – Non-Contact Cooling Water Discharge/Monthly Parameter

The permit requires Raft River to collect non-contact cooling water samples on a monthly basis. The samples are to be 24-hour composites to ensure that a representative effluent sample is collected. The parameters to be analyzed include total phosphorous, arsenic, lead, chloride, fluoride, total iron, total manganese, specific conductivity, and pH. In the event that DEQ should determine the facility's land application operations are resulting in adverse impacts, the agency may modify the permit in accordance with IDAPA 58.01.17.700 to include additional monitoring requirements and/or parameters.

4.3.3 Total Dissolved Inorganic Solids (TDIS) Monitoring Requirements – Non-Contact Cooling Water Discharge/Quarterly Parameter

The permit requires Raft River to monitor TDIS concentrations in the non-contact cooling water on a quarterly basis. The permit requires monitoring of TDIS due to the elevated TDS concentrations in ground water at this site. This parameter provides information for specific ion species present in the non-contact cooling water and should provide better characterization of the nature of TDS land applied at this site.

4.3.4 Total Dissolved Solids/Volatile Dissolved Solids (TDS/VDS) and Nitrate Monitoring Requirements – Non-Contact Cooling Water Discharge/Quarterly Parameter, First Year Only With DEQ Concurrence

The permit requires TDS and VDS in the non-contact cooling water to be monitored quarterly for the first year of the permit. Upon obtaining DEQ's written concurrence, the permittee may waive this monitoring requirement after the first year. These two parameters can be used to estimate an annual non-volatile dissolved solids (NVDS) loading rate (i.e., TDS less VDS approximates the NVDS), which approximates the inorganic fraction of the TDS. The inorganic fraction is of particular interest when assessing the impacts of TDS loading to ground water. When used in conjunction with the quarterly TDIS data collected during the same time period, the TDS/VDS data should also establish a correlation between NVDS and TDIS. This correlation can then be used to estimate future NVDS loading rates, as needed, based upon the ongoing TDIS data collected.

The WRP also requires Raft River to collect effluent samples for total Kjeldahl nitrogen and nitrate analyses. Although the nitrate concentrations in the non-contact cooling water are expected to be negligible, this one-year requirement (i.e., with DEQ's written concurrence) will ensure complete characterization of the non-contact cooling water quality.

4.3.5 Total Volumetric Flowrate Measurement Requirement – Irrigation Water/Monthly Parameter

Raft River is also required to monitor and record the volume of supplemental irrigation water applied to each HMU, which will allow assessment of the total (i.e., non-contact cooling water and irrigation water) annual hydraulic load to each site. The hydraulic load to each HMU is important in assessing the potential for impacts to ground water. This monitoring requirement specifies a monthly recording basis, and irrigation water discharge to land as the monitoring point.

4.3.6 Ground Water Monitoring Requirements – Monitoring Wells/Quarterly Parameter for First Year and Biannual Parameter after First Year

The permit requires Raft River to pull ground water samples from dedicated monitoring wells quarterly for the first year of the permit, and twice per year for each remaining year of the permit. This monitoring requirement will allow ongoing assessment of localized ground water quality. Raft River is required to sample and analyze ground water for nitrate-nitrogen, total phosphorous, TDS, total iron, total manganese, arsenic, lead, chloride, fluoride, pH, specific conductivity, temperature, dissolved oxygen, and water table depth. In the event that DEQ should determine the facility's land application operations are resulting in adverse impacts, the agency may modify the permit in accordance with IDAPA 58.01.17.700 to include additional ground water monitoring requirements and/or parameters.

4.3.7 Soil Monitoring Requirements – Each Soil Management Unit (SMU)/Annual Parameters

Raft River is required to sample soils from each SMU once per year. Each of the three SMUs correlate with one of the three HMUs at this site, and are identified in Appendix 1 of the permit. This permit provision is intended to assist in ensuring that the land application activities do not impair the sites with extended use over time. The permittee is required to sample and analyze soils for plant available phosphorous, sodium absorption ratio, chloride, sodium, dissolved iron, dissolved manganese, electrical conductivity, and pH.

4.3.8 Seasonal Loading Assessment Requirements – Annual Parameters

This permit provision requires Raft River to calculate water table elevation(s) in each monitoring well and annual constituent loadings for each HMU. The facility is also required to report this information in the Annual Report, required in Section H of the permit.

4.3.9 Flow Measurement Calibration Requirement – Annual Parameters

This permit provision requires Raft River to calibrate all flow meters and pumps used to directly or indirectly measure all non-contact cooling water and irrigation water flows applied to each HMU. This permit condition has been included to ensure accuracy in the monitoring data reported to DEQ.

4.3.10 Backflow Prevention Device Testing Requirement – Annual Parameter

This condition requires Raft River to test all backflow prevention devices for all supplemental irrigation pumps directly connected to the non-contact cooling water distribution system. The testing date(s) and results of the test are the parameters to be monitored and reported. If any test fails, the date of repair or replacement of the backflow prevention device, as well as a retest of the repaired/replaced device is required. This is condition is ultimately intended to protect ground water and/or surface water quality at the site.

4.4 Reporting Requirements – Section H

Section H of the permit contains the Annual Report requirements for the land application sites. The Annual Report should be submitted no later than January 31 of each year, and should essentially contain results from all work conducted during the previous annual period for each monitoring requirement listed in Section F of the permit. This section also contains reporting requirements for all compliance activities contained in the permit.

4.5 Compliance Schedule for Required Activities – Section E

The following compliance activities have been implemented within the draft WRP in order to address various regulatory issues and/or update permit materials to reflect the ongoing status of facility operations.

4.5.1 Plan of Operation

Operation of the land application system will be documented in a Plan of Operation, also referred to as the Operations and Maintenance Manual (O&M Manual), required under Compliance Activity No. CA-210-01 of the permit. The O&M Manual shall be submitted for DEQ review and approval prior to application of any non-contact cooling water on the HMUs. Upon receiving DEQ's approval, the O&M Manual will be incorporated into the terms and conditions of the permit, and will be enforceable as such (i.e., refer to Section B of the permit).

The O&M Manual should serve as a guide for actual day-to-day operations needed to ensure proper operation of the facility, and should outline all monitoring activities needed to satisfy permit requirements. The O&M Manual will include or identify all sample collection methods, appropriate analytical methods, and companion QA/QC protocols needed to meet the sampling requirements of the permit. This is intended to ensure that representative sampling and accurate analytical data are collected. The O&M Manual must also contain a complete log, documenting the types and amounts of additives used in the non-contact cooling water (i.e., refer to Section 3.3 of this document for further discussion regarding these additives). This is intended to ensure proper regulatory oversight of constituents applied to the land application sites. Finally, in the event that the permittee elects to conduct grazing activities, the O&M Manual shall contain a grazing management plan. This provision is intended to prevent any grazing activities from impairing or degrading the land application systems.

4.5.2 Ground Water Monitoring Network Plan

Prior to application of non-contact cooling water onsite, Raft River must submit plans and specifications for a ground water monitoring network for DEQ review and approval. As discussed previously in this document, modeling assessments conducted by Raft River indicate that the proposed land-application activities will not adversely impact the shallow aquifer; however, given the uncertainties associated with modeling projections, a ground water monitoring network is required to ensure protection of existing ground water quality at this site.

4.5.3 Runoff Management Plan

As was discussed under Section 3.1.2 of this document, the facility is located along a section of the Raft River that is a 303(d)-listed water body, and must be protected from loadings of temperature, bacteria, and bed load sediment. Consequently, the facility must implement BMPs to prevent any runoff from the land application sites. Compliance Activity No. CA-210-03 requires Raft River to submit a Runoff Management Plan within a year of permit issuance, to set forth a plan for implementation of BMPs or other control structures designed to prevent runoff from any site or fields used for land application. Upon receiving DEQ's approval, the Runoff Management Plan will be incorporated into the terms and conditions of the renewal permit, and will be enforceable as such (i.e., refer to Section B of the permit).

4.5.4 Surface Water Interconnectivity Assessment

In an effort to further ensure that Raft River's land application and/or recharge operations do not result in any adverse impacts to the Raft River Subbasin, Compliance Activity No. CA-210-04 of the permit requires the permittee to assess the potential for interconnectivity between the three HMUs and the Raft River Subbasin. This assessment is required for submittal to DEQ within six months after four

complete years of ground water table depth measurements and ground water table elevation estimates (i.e., required monitoring parameters under Section G of the permit) have been acquired for the site. Other data may also be used in this assessment. If the assessment finds that a ground water discharge of non-contact cooling water has been, or is likely to be, transported into the Raft River Subbasin from any of the three HMUs, this issue, including surface water sampling and analyses as appropriate, must be appropriately addressed within the permit renewal application materials required by Compliance Activity No. CA-210-05 of the permit. DEQ has included this compliance activity within the permit to address various operational uncertainties that exist at the current stage of development in the project's implementation (e.g., the actual concentration factor to be used in the non-contact cooling loop, design and arrangement of the NGS recharge basin, etc.), as well as similar uncertainties associated with the limited amount of site-specific table water elevation data collected for this site at the present time (e.g., the degree of seasonal fluctuation in elevations, any changes in elevations over an extended period of time, etc.).

4.5.5 Renewal Permit Application

Compliance Activity No. CA-210-05 in the permit requires Raft River to submit a permit application renewal package six months prior to the permit's final expiration date.

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft WLAP Permit No. LA-000210-01 for a public review and comment period.